



PATENT
Attv. Dkt. AMAT/5351/CPI/L/B/PJS

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Group Art Unit: 2818

Examiner: R. Berry

For: System and Method to  
Form a Composite Film  
Stack Utilizing Sequential  
Deposition Techniques

**CERTIFICATE OF MAILING**  
**37 CFR 1.8**

I hereby certify that this correspondence is being deposited on  
May 20, 2003 with the United States Postal Service as First  
Class Mail in an envelope addressed to: Commissioner for  
Patents, P.O. Box 1450 Alexandria, VA 22313-1450.

5-20-03 Penney News  
Date Signature

Dear Sir:

## SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

The Applicants, and the Attorney who signs below on the basis of the information supplied by the inventor and the information in his file, submit herewith patents, publications, or other information of which they are aware, which may be material to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 CFR § 1.56.

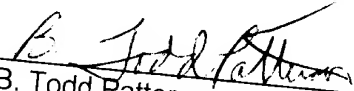
While the information submitted in this Supplemental Information Disclosure Statement may be material pursuant to 37 CFR § 1.56, it is not intended to constitute an admission that any patent, publication, or other information referred to therein is prior art for this invention unless specifically designated as such.

In accordance with 37 CFR § 1.97, this Supplemental Information Disclosure Statement is not to be construed as a representation that a search has been made or that no other possibly material information as defined under 37 CFR § 1.56(a) exists.

The patents and/or publications submitted herewith are set forth on the attached Form PTO-1449.

If the sum of \$180.00 is due under 37 CFR § 1.17(p) pursuant to § 1.97, the Commissioner is hereby authorized to charge this fee, and any other fee necessary to make this submission timely, to the Deposit Account No. 20-0782/APPM/5351/BTP.

Respectfully submitted,



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|                                                                                      |  |                                         |                           |
|--------------------------------------------------------------------------------------|--|-----------------------------------------|---------------------------|
| U.S. Department of Commerce, Patent and Trademark Office<br>(PTO Form 1449 modified) |  | Docket No.<br>AMAT/5351/CPI/L/B/<br>PJS | Serial No.<br>09/885,609  |
| <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>                                 |  | Applicant<br>Mak, et al.                | Confirmation No.:<br>5337 |
| (Use several sheets if necessary)                                                    |  | Filing Date<br>June 20, 2001            | Group<br>2818             |
| Examiner R. Berry                                                                    |  |                                         |                           |

**U.S. Patent Documents**

| *Examiner Initial |     | Document Number | Issue Date | Applicant(s) Name   | Class | Subclass | Filing Date If Appropriate |
|-------------------|-----|-----------------|------------|---------------------|-------|----------|----------------------------|
|                   | A1  | 6,548,424       | 04/15/03   | Putkonen            | 438   | 785      | 04/16/01                   |
|                   | A2  | 6,534,395       | 03/18/03   | Werkhoven, et al.   | 438   | 627      | 03/06/01                   |
|                   | A3  | 6,511,539       | 01/28/03   | Raaijmakers, et al. | 117   | 102      | 09/08/99                   |
|                   | A4  | 6,468,924       | 10/22/02   | Lee, et al.         | 438   | 763      | 05/31/01                   |
|                   | A5  | 6,458,701       | 10/01/02   | Chae, et al.        | 438   | 680      | 10/12/00                   |
|                   | A6  | 6,416,577       | 07/09/02   | Suntoloa, et al.    | 117   | 88       | 06/07/00                   |
|                   | A7  | 6,399,491       | 06/04/02   | Jeon, et al.        | 438   | 680      | 04/06/01                   |
|                   | A8  | 6,372,598       | 04/16/02   | Kang, et al.        | 438   | 399      | 06/16/99                   |
|                   | A9  | 6,348,376       | 02/19/02   | Lim, et al.         | 438   | 253      | 01/19/01                   |
|                   | A10 | 6,342,277       | 01/29/02   | Sherman             | 427   | 562      | 04/14/99                   |
|                   | A11 | 6,333,260       | 12/25/01   | Kwon, et al.        | 438   | 643      | 06/24/99                   |
|                   | A12 | 6,287,965       | 09/11/01   | Kang, et al.        | 438   | 648      | 02/23/00                   |
|                   | A13 | 6,207,487       | 03/27/01   | Kim, et al.         | 438   | 238      | 10/12/99                   |
|                   | A14 | 6,197,683       | 03/06/01   | Kang, et al.        | 438   | 643      | 09/18/98                   |

**Foreign Patent Documents**

| *Examiner Initial |    | Document Number | Date     | Country | Class | Subclass | Translation              |                          |
|-------------------|----|-----------------|----------|---------|-------|----------|--------------------------|--------------------------|
|                   |    |                 |          |         |       |          | YES                      | NO                       |
|                   | B1 | 02/45167        | 06/06/02 | WO      | H01L  | 27/00    | <input type="checkbox"/> | <input type="checkbox"/> |
|                   | B2 | 02/067319       | 08/29/02 | WO      | H01L  | 21/768   | <input type="checkbox"/> | <input type="checkbox"/> |
|                   | B3 | 00/79576        | 12/28/00 | WO      | H01L  | 21/205   | <input type="checkbox"/> | <input type="checkbox"/> |

**OTHER ART**

| *Examiner Initial |    | Including Author, Title, Date, Pertinent Pages, Etc.                                                                                                                             |
|-------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | C1 | Rossnagel, et al. "Plasma-enhanced Atomic Layer Deposition of Ta and Ti for Interconnect Diffusion Barriers," J. Vacuum Sci. & Tech. B., Vol. 18, No. 4 (July 2000), pp. 2016-20 |
|                   | C2 | Ritala, et al. "Atomic Force Microscopy Study of Titanium Dioxide Thin Films Grown by Atomic Layer Epitaxy," Thin Solid Films, Vol. 228, No. 1-2 (15 May 1993), pp.32-35         |

|          |                 |
|----------|-----------------|
| Examiner | Date Considered |
|----------|-----------------|

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.

**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

(Use several sheets if necessary)

Examiner R. Berry

Docket No.

AMAT/5351/CPI/L/B/  
PJS

Serial No.

09/885,609

Applicant

Mak, et al.

Confirmation No.:

5337

Filing Date

June 20, 2001

Group

2818

**U.S. Patent Documents**

| *Examiner Initial | Document Number | Issue Date | Applicant(s) Name | Class | Subclass | Filing Date If Appropriate |
|-------------------|-----------------|------------|-------------------|-------|----------|----------------------------|
| A1                | 6,042,652       | 03/28/00   | Hyun, et al.      | 117   | 719      | 09/07/99                   |
| A2                | 5,526,244       | 06/11/96   | Bishop            | 362   | 147      | 05/24/93                   |
| A3                | 2003/0082300    | 05/01/03   | Todd, et al.      | 427   | 255.27   | 02/11/02                   |
| A4                | 2003/0072975    | 04/17/03   | Shero, et al.     | 428   | 704      | 09/26/02                   |
| A5                | 2003/0049942    | 03/13/03   | Haukka, et al.    | 438   | 778      | 08/22/02                   |
| A6                | 2003/0032281    | 02/13/03   | Werkhoven, et al. | 438   | 640      | 09/23/02                   |
| A7                | 2003/0031807    | 02/13/03   | Elers, et al.     | 427   | 569      | 09/17/02                   |
| A8                | 2003/0013320    | 01/16/03   | Kim, et al.       | 438   | 778      | 05/31/01                   |
| A9                | 2002/0187631    | 12/12/02   | Kim, et al.       | 438   | 637      | 12/05/01                   |
| A10               | 2002/0187256    | 12/12/02   | Elers, et al.     | 427   | 99       | 07/30/02                   |
| A11               | 2002/0182320    | 12/05/02   | Leskela, et al.   | 427   | 250      | 03/15/02                   |
| A12               | 2002/0177282    | 11/28/02   | Song              | 438   | 300      | 12/18/01                   |
| A13               | 2002/0135071    | 09/26/02   | Kang, et al.      | 257   | 767      | 01/16/02                   |
| A14               | 2002/0121697    | 09/05/02   | Marsh             | 257   | 751      | 04/30/02                   |

**Foreign Patent Documents**

| *Examiner Initial | Document Number | Date     | Country | Class | Subclass | Translation                                       |
|-------------------|-----------------|----------|---------|-------|----------|---------------------------------------------------|
| B1                | 00/15865        | 03/23/00 | WO      | C23C  | 16/00    | YES NO                                            |
| B2                | 99/29924        | 06/17/99 | WO      | C23C  | 16/04    | <input type="checkbox"/> <input type="checkbox"/> |
| B3                | 99/01595        | 01/14/99 | WO      | C30B  | 25/14    | <input type="checkbox"/> <input type="checkbox"/> |

**OTHER ART**

| *Examiner Initial | Including Author, Title, Date, Pertinent Pages, Etc.                                                                                           |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| C1                | Ritala, et al. "Growth of Titanium Dioxide Thin Films by Atomic Layer Epitaxy," Thin Solid Films, Vol. 225, No. 1-2 (25 March 1993) pp. 288-95 |
| C2                | Min, et al. "Chemical Vapor Deposition of Ti-Si-N Films With Alternating Source Supply," Mat. Rec. Soc. Symp. Proc. Vol. (1999)                |

Examiner

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.

Date Considered

|                                                                                      |  |                                         |                           |
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| *Examiner Initial |     | Document Number | Issue Date | Applicant(s) Name   | Class | Subclass | Filing Date If Appropriate |
|-------------------|-----|-----------------|------------|---------------------|-------|----------|----------------------------|
|                   | A1  | 2002/0109168    | 08/15/02   | Kim, et al.         | 257   | 295      | 01/30/02                   |
|                   | A2  | 2002/0106536    | 08/08/02   | Lee, et al.         | 428   | 702      | 02/02/01                   |
|                   | A3  | 2002/0105088    | 08/08/02   | Yang, et al.        | 257   | 774      | 10/31/01                   |
|                   | A4  | 2002/0081844    | 06/27/02   | Jeon, et al.        | 438   | 680      | 02/28/02                   |
|                   | A5  | 2002/0076837    | 06/20/02   | Hujanen, et al.     | 438   | 3        | 11/28/01                   |
|                   | A6  | 2002/0076507    | 06/20/02   | Chiang, et al.      | 427   | 569      | 10/24/01                   |
|                   | A7  | 2002/0074588    | 06/20/02   | Lee                 | 257   | 306      | 07/06/01                   |
|                   | A8  | 2002/0061612    | 05/23/02   | Sandhu, et al.      | 438   | 151      | 01/14/02                   |
|                   | A9  | 2002/0048635    | 04/25/02   | Kim, et al.         | 427   | 331      | 08/08/99                   |
|                   | A10 | 2002/0021544    | 02/21/02   | Cho, et al.         | 361   | 200      | 08/07/01                   |
|                   | A11 | 2002/0000598    | 01/03/02   | Kang, et al.        | 257   | 301      | 07/26/01                   |
|                   | A12 | 2001/0054730    | 12/27/01   | Kim, et al.         | 257   | 301      | 05/23/01                   |
|                   | A13 | 2001/0050039    | 12/13/01   | Park                | 117   | 102      | 06/05/01                   |
|                   | A14 | 2001/0028924    | 09/27/01   | Raaijmakers, et al. | 365   | 200      | 02/22/01                   |

**Foreign Patent Documents**

| *Examiner Initial |    | Document Number | Date     | Country | Class | Subclass | Translation              |                          |
|-------------------|----|-----------------|----------|---------|-------|----------|--------------------------|--------------------------|
|                   |    |                 |          |         |       |          | YES                      | NO                       |
|                   | B1 | 98/51838        | 11/19/98 | WO      | C23C  | 16/06    | <input type="checkbox"/> | <input type="checkbox"/> |
|                   | B2 | 2001-111000     | 12/26/00 | JP      | H01L  | 29/00    | <input type="checkbox"/> | <input type="checkbox"/> |
|                   | B3 | 2,355,747       | 05/02/01 | GB      | C23C  | 16/44    | <input type="checkbox"/> | <input type="checkbox"/> |

**OTHER ART**

| *Examiner Initial |    | Including Author, Title, Date, Pertinent Pages, Etc.                                                                                                              |
|-------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | C1 | Klaus, et al. "Atomically Controlled Growth of Tungsten and Tungsten Nitride Using Sequential Surface Reactions," Applied Surface Science, 162-163 (2000) 479-491 |
|                   | C2 |                                                                                                                                                                   |
| Examiner          |    | Date Considered                                                                                                                                                   |

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